

USER MANUAL FOR DIGITAL THERMOSTAT COOL / HEAT WITH DEFROST

F 100 / TSF 100 / M1



User's Manual – V2
www.osakasolutions.com

INTRODUCCIÓN



In this manual are the information necessary for proper installation and instruction for use and maintenance of the product, it is recommended to read carefully and keep it. To prevent erratic operation or malfunction of the THERMOSTAT that can create dangerous situations, damage to persons, things or animals, please remember that the facility must meet and be aware of the safety systems annexes necessary to ensure their safety.

OSAKA SOLUTIONS or their legal representatives are not responsible for misuse of THERMOSTAT or not conforming to the characteristics of the THERMOSTAT.

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1 – DESCRIPTION OF DEVICE

1.1 – GENERAL DESCRIPTION

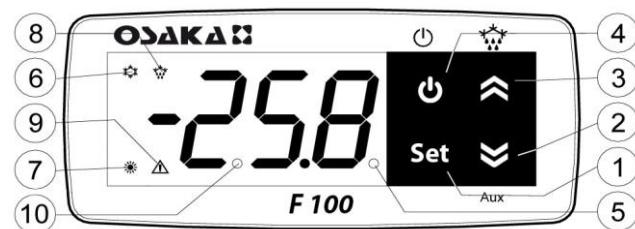
The F 100 / TSF 100 / M1 are digital electronic thermostats with suitable microprocessor for refrigeration and industrial processes, equipped with temperature control with ON / OFF control and defrost compressor stoppage time intervals.

Thermostats have a relay output and an input for temperature sensor PTC or NTC and also an internal buzzer for acoustic signalling ALARM and programming.

Models F 100 / TSF 100 / M1 differs from other standard models for the design and screen system keyboard.

1.2 – DESCRIPTION OF FRONT PANEL

F 100 Front panel



TSF 100 Front panel



M1 Front panel



1 - Key "SET": Pressing and releasing, programming control value (Set point). Keeping for 5 seconds, the setup menu entry.

2 - DOWN Key: Pressing directly without entering the menu, serves to decrease the value of the SET POINT. On the menu parameters used to search the desired parameter and after pressing the selection parameter "SET" serves to diminish or select the new value of the parameter.

3 - UP / DEFROST Key: Holding down for 5 seconds to start a manual defrost (if the conditions of end defrost probe has no value beyond the end of defrost).

In the parameter menu is used to find the desired parameter and after pressing the selection parameter "SET" serves to increase or select the new value of the parameter.

4 - Key \oplus / "F": It is possible to perform 3 functions:

- a) Shows the value of the evaporator probe, or the third probe (in the case of being programmed).
- b) Pressing for 1 second can power cycle the device (ON / OFF), programming the "UF" parameter.
- c) Exit Parameter Programming

5 - Led SET: Indication shown in the programming mode the set point. In the parameter menu, indicates the level of programming said parameter.

6 - Led OUT COOL: Indicates the status of the control output (compressor or control device temperature, solenoid actuator, etc..) This output is active (lit) and off (off) and disabled signal (flashing).

7 - Led OUT HEAT: Identical to "Led OUT COOL", but for the heat function.

8 - Led DEF: Indicates the current status of defrost, Pilot flashing indicates defrosting is being done.

9 - Led ALARM: Indicates the status of the alarm. ON (lit) OFF (stopped) or Ongoing (intermittent)

10 - Led Stand-By: Indicates he's Stand-By

(Press Key \oplus or "F" for 3 seconds to activate or digital input).

2 - PROGRAMMING

2.1 - MODIFICATION OF SET POINT

Press the "SET" key and release, the display will show "SP" alternating control value.

To change the value, press "up" to increase value and "down" to descend.

If "Up or Down" key is held quickly increase speed to help select a distant value.

After selecting the desired value is confirmed by pressing "SET" or self confirm whether any last key pressed 10 seconds, turning the thermostat to normal operation.

2.2 - PROGRAMMING PARAMETERS

If the Password parameter access is not enabled (default setting), press "SET" for 5 sec., The display will show the code that identifies the first parameter and the "Up" or "Down" button you can select the desired parameter.

After selecting the desired parameter, press the "SET" key and the value will be programmed to the desired parameter. This setting can be changed by pressing the "Up" or "Down" to the desired value. Press "SET" to confirm and store the value.

Returning to the "Up" or "Down" keys again be possible to select another parameter and modify it on.

To exit the programming mode: do not touch any key for 10 seconds or press the \oplus or "F" key for 2 sec.

2.3 - PASSWORD PROTECTION PARAMETERS

The instrument has a parameter protection function with configurable password code in the "t, PP" parameter.

In some cases, this password is very useful so that no improper handling in, if you want to change the password once entered the desired number and password in the "t, PP" parameter, Exit programming.

When the password is programmed, pressing "Set" for 5 seconds to enter the settings menu, the computer displays the acronym 'rP' and pressing "Set" show "O", then we select the buttons "up" or "down" the value of correct password code and press "set" to proceed to access the programming parameters.

If the password is correct, the display will show the code of the first parameter. The password protection can be disabled with the "t.PP" = OF parameter.

Note: If lost the password to access the parameters, use the following procedure:

Turn off electrical power to the computer and re-feeding while you press the "SET" button for 5 seconds. Access parameters will be taken and you could modify the "t.PP" parameter.

2.4 CUSTOMIZING SETTINGS

The password protects with just a few other parameters without password in order to let the user access to the parameters required, while access to all parameters that are specific technical or machine manufacturer.

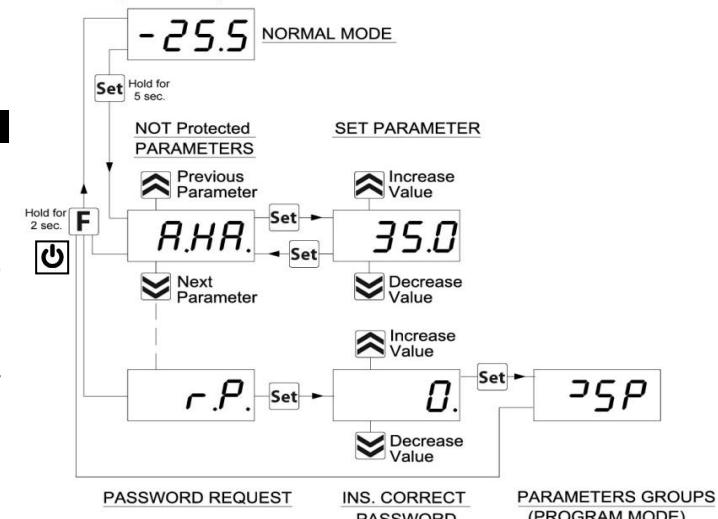
Method to select the level of programming parameters:

Access programming through password and select the parameter to be programmed without password. If the SET LED flashes means that the parameter is programmable only with the password, or protected, and if the LED is fixed indicates that the parameter is direct access without password.

To change the level of visibility of the parameter press together "Up + Set" keys.

The SET LED will change state in indicating the new access level parameter (protected, flashing LED) and (direct access without password, fixed LED).

Upon entering the first parameter menu visualize user level parameters (unprotected) and then (protected) by entering the password if the device shows "rP"



2.5 - RESTORATION INITIAL PARAMETERS

The device has a parameter reset, restoring the program to Factory Settings.

To enter this Reset "rP" the password value to "- 48"

The display will show "---" and the instrument will reset.

2.6 - KEY LOCK FUNCTION

It is possible to completely lock the keys. Such a function is useful when the control is accessible to the public and you want to prevent tampering. The key lock function is activated by setting the "t.Lo" parameter to a value of OF.

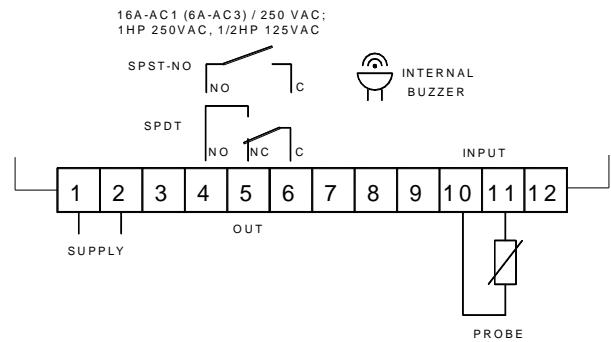
The value set in par. "T.Lo" is the time that the thermostat allows access to the keyboard and after passing this time the thermostat is locked.

Pressing any key displays the thermostat "Ln" to inform the lock is activated.

To unlock the keyboard press "Set + Up" for 5 sec., The display will show "LF" and all keyboard functions again become operational.

3.4 – ELECTRICAL WIRING DIAGRAM

Wiring scheme of F 100 and TSF 100



3 – INSTRUCTIONS FOR USE AND INSTALLATION

3.1 – USE

The devices are made as measuring and regulating equipment in accordance with EN 61010-1 norm for operation up to an altitude of 2000 mts.

The use of equipment for standard applications not expressly provided in norm cited above, should provide all measurement and adjustments necessary protection.

The equipment must be adequately protected and away from liquids, dust, grease and dirt. They must be accessible only with the use of a right tool and safety system (except the front).

The devices can NOT be used in dangerous environments (flammable or explosive) without adequate protection.

It is recalled that the installer must ensure that the norm for electromagnetic compatibility is respected after implantation in the installation of equipment, eventually using the right filters if is needed.

In case of failure or malfunction of measuring and control equipment that can create dangerous situations or damage to persons, things, animals or products (defrost food or changes in their ideal state), it is recalled that the facility should be equipped with electronic devices or electromechanical safety and warning system.

They should be placed outside the measuring and control equipments, possible protective devices, responding to specific safety requirements that are covered by the norm of the product or suggest the common sense.

For your own safety, is highly recommended fulfilling the instructions provided above.

3.2 - MECHANICAL ASSEMBLY

The thermostat housing 32 x 74 mm is designed for wall mounting or wall using the holes in the plastic and predisposed accessible after removing the front.

Once the equipment is installed is recommended to close the front cover.

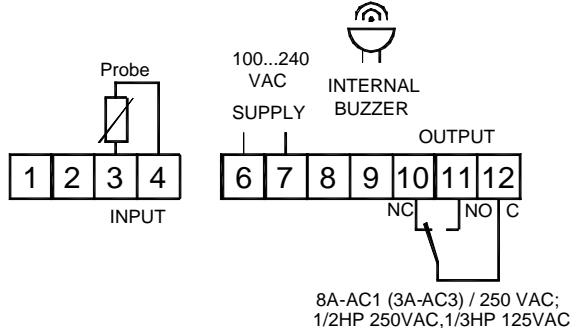
Avoid placing the thermostat in place exposed to high humidity or dust, this can cause condensation or introduction of conductive particles or substances. Ensure that you have adequate ventilation and avoid installing indoor sealed boxes or areas where the temperature exceeds the specifications of the team. Avoid installing the cables and power supply together with the probe out and install equipment that can generate disturbances (electrical noise) as motors, fans, inverters, automatic gates, contactors, relays, solenoids, etc...

3.3 – ELECTRICAL CONNECTIONS

The thermostat is designed for permanent connection between devices, no switch is equipped with internal devices of potency for overcurrents or overvoltages. It is therefore recommended to install a equipment as close and easy access to court if necessary, as a general safety thermal / isolator switch / device magneto. Are reminded that you must use appropriate wire to own isolation voltage, current, temperature and local electrical codes should also separate the signal wires from the power probe and power as far as possible in order avoid possible electrical noise, electromagnetic induction, which in some cases could be diminished or cancelled with RC filters, ferritic, supply, resistors, etc. ... the use of wires with antiparasitic mesh and this mesh is recommended to connect on one side to take ground.

It is recommended to check that the equipment settings are appropriate to the application before connecting wires actuators, loads on the output relays in order to prevent malfunctions or damage.

Wiring scheme of M1



4 - OPERATION

4.1 – FUNCTION ON / OFF (STAND-BY)

The once fed can make 2 states:

- **ON**: means that the driver is running and acting on the basis of planned control.
- **STAND-BY**: means that the control does not acts, stop. (The display illuminates the LED Stand-by).

The situation of a stand-by is a failure of regulation is often useful to use the front keypad as selector **stop / start** mode.

The key **U** or "F" pressed for 3 sec Lets stop to change gear or vice versa always par. "T.UF" = 4.

4.2 – MEASURE AND DISPLAY

By the par. "I.SE" is selected if the probe you want to use is the type KTY81 PTC-121 (**Pt**) or NTC 103AT-2 (**nt**).

With the par. "**UP**" is selected if the unit of measure to use is the temperature in degrees Celsius (Standard) or Fahrenheit (USA) (**C0** = °C / 1 ° (no decimal); **C1** = °C / 0.1 ° (with decimal) **F0** = °F / 1 °, **F1** = °F / 0.1 °).

The calibration of the measurement can be done in 2 ways, the overall correction instrument is calibrated using the parameter "**I.C1**". visualization and regulation. (Standard)

Or the parameter. "**I.CU**" which allows an offset to be applied only to the display screen (the control will be controlled depending on only the correction of the "**I.C1**" parameter).

By the par. "**I.Ft**" may introduce a software filter for measuring the input value mode to decrease sensitivity to rapid changes in temperature (increasing time). The instrument displays the temperature measurement is even possible to see the maximum and minimum peak measured by key **U** or "F".

Quickly by pressing **U** or "F" display will show alternately:

"**Lt**" is the low temperature stored

"**Ht**" is the maximum temperature stored

"**Pr1**" is the instantaneous temperature.

The minimum and maximum peak is reset by removing power to the device or press the "**Down**" key 3 seconds during viewing the value of max. or low. Once reset visualize "---

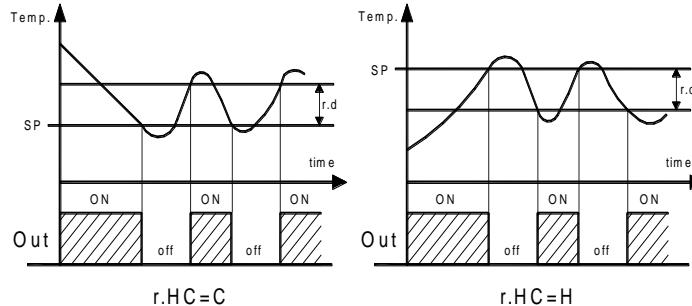
Of display Menu at max. and min. the device will automatically exit in 15 seconds.

Remember that the display on the probe can be modified by the display lock function with parameter defrosting. "D.dL" (see function. "Defrost").

4.3 – THERMOSTAT TEMPERATURE

The mode of regulation of the instrument is the **ON / OFF** type on the relay outputs depending on the probe and the active Set Point "SP" and the differential (hysteresis) intervention "rd" and mode "r.HC".

In the operation mode set in the "r.HC" parameter applies to the following differential: ("r.HC" = C) setting cold (**cold**) the differential used as positive and triggers the relay to reach the set point and stops again until the temperature exceeds the set point + differential. If ("r.HC" = H) configuration Heat (**Heat**) the differential used as negative and triggers the relay to reach the set point and stops until the temperature drops again below the set point - differential.



In case of probe error is possible that the output programmed as function **ot** cycling time programmed on par. "R.t1" (activation time) and "r.t2" (deactivation time) for error.

Programming "t1" = oF the output probe condition remains always off.

Programming "r.t1" any value "r.t2" = oF the output in probe error condition will remains On.

It is recalled that the operation temperature can be conditioned on the following functions:

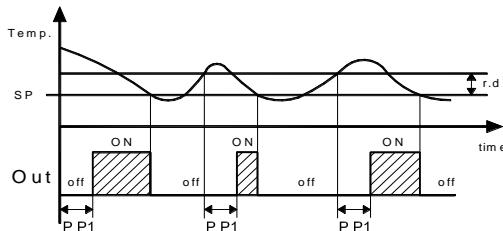
"Compressor Protection", "Delay-start" and "Defrost".

4.4 – COMPRESSOR PROTECTION

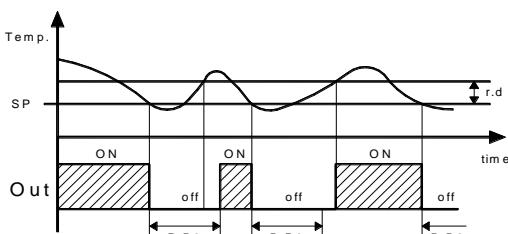
Compressor protection feature helps to avoid very frequent compressor starts or it can also be useful for control in time for the relay output to an actuator or intended load. Activate this function provides 3 types of timing choice as appropriate to the control system.

The protection is to prevent multiple starts during the time of protection.

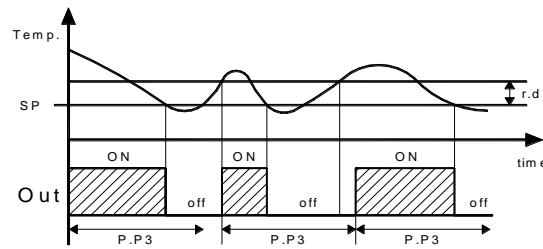
The first provides a delay time to the activation of the output according to the time set in the "P.P1" parameter (delay to start).



The second time provides a delay of control relay, in order to ensure a minimum time between the arrest and the progress of the relay parameter: "P.P2" (delay after stop or minimum downtime).



The third time provides permit no starts if has exceeded the programmed time between consecutive starts. Parameter "P.P3" (delay after consecutive starts).



If protection is acting, hindering the progress of the relay for the programmed time, the relay output LED (Cool or Heat) is flashing. Is possible activate a delay to the start of the regulation to when arrives the supply to the thermostat. Parameter "P.od" very suitable when multiple thermostats to not start at the same time allowing the loads and power line a softer boot.

During this phase delay visualized **od** alternating scheduled to normal viewing.

The delay function "**od**" = disables programming as **oF**.

4.5 – DEFROST CONTROL

The defrost timer is type "compressor failure" at scheduled intervals.

Defrost is programmed in the parameter "D.Di" time between defrost cycles between the end of one and beginning of the successive. We can force a defrost at first start defrost, par. "D.Sd".

If you want each instrument start defrosting is done schedule time parameter "d.Sd" = oF. So starting immediately conduct one.

If you do not want to start defrosting then will the defrost cycle for this program "d.Sd" = "D.Di".

Programming "D.Di" = oF all defrosting is disabled. Therefore, the instrument provides each defrost, compressor disable relay for the time "d.dE".

4.5.1 – MANUAL DEFROST

To activate a manual defrost press the "Up / DEFROST" button for 5 seconds and the led "Def" lights and perform defrosting. To terminate a defrost cycle while doing this press the "Up / Def" button again for 5 seconds.

4.5.2 – LOCK DISPLAY DURING DEFROST

Using parameters "d.dL" and "A.Da" display behaviour is established during defrosting.

The "d.dL" parameter causes blockage of the last temperature before defrost on the display ("d.dL" = on) until you reach the end of defrost and the temperature does not exceed below the value of the last preset temperature or condition ["SP" + "rd"], or times out lock security. "A.Da".

Also allows visualization of the indicative initials Defrost "dEF" ("dI" = Lb) and after defrost the acronym "PdF" indicating time defrost finish temperature cold but not recovered to control value ("SP" + "rd") or times out lock security. "A.Da".

Another possibility is to indicate the actual temperature of the cold chamber or cabinet, during defrosting ("d.dL" = oF).

4.6 - ALARM FUNCTIONS

Alarm conditions:

- Probe Error: "E1", "-E1"
- Temperature alarm: "Hi", "Lo"

The alarm function is displayed in LED and ALARM programmable internal buzzer in the "o.bu" parameter.

The pair. "o.bu" allows the configuration of the internal buzzer:

- = **OF** - off buzzer
- = **1** - the buzzer is activated only for alarm signals
- = **2** - the buzzer is activated only to point out the key presses and no warning signs.
- = **3** - The buzzer is activated only to point out the keystrokes and alarm signals.

Any alarm condition is indicated by the LED ALARM while the condition is pre alarm or alarm delay is indicated by the flashing LED. The buzzer can be configured to signal alarms the par. "O.bu" = 1 or 3 and can be deactivated in case you are playing with the press of a key.

4.6.1 – TEMPERATURE ALARMS

The alarm function is a function of temperature reading from the probe, and the type of programmed alarm parameter. "A.Ay" and the alarm set point par. "A.HA" (maximum alarm) and "A.LA" (minimum alarm) and the relative differential "A.Ad".

Through the "A.Ay" parameter you can specify whether the alarm set "A.HA" and ".LA" should be considered absolute ("A.Ay" = 1) or relative to the Set Point ("A.Ay" = 2).

By some parameters may delay activation, if the situation is cancelled recovering optimal conditions, without becoming alarm.

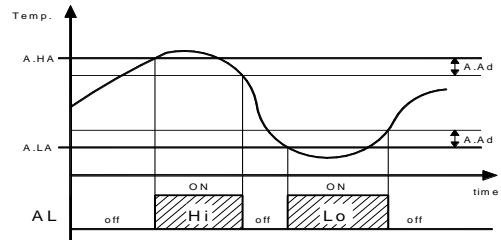
These parameters are:

"A.PA" - delay in receiving the alarm and turn on the power control equipment, should be in alarm.

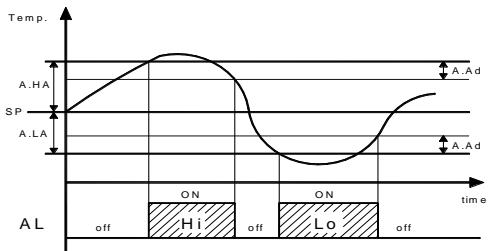
"A.Da" - delay after defrost (A. maximum) or after a continuous cycle (A. Min).

"A.At" - delay of the performance of temperature alarm.

The differential alarm will be the same set in parameters "A.HA" and "A.LA" if alarms are absolute ("A.Ay" = 1).



Or shall result from: ["SP" + "A.HA"] and ["SP" + "A.LA"] if the alarm is on ("A.Ay" = 2).



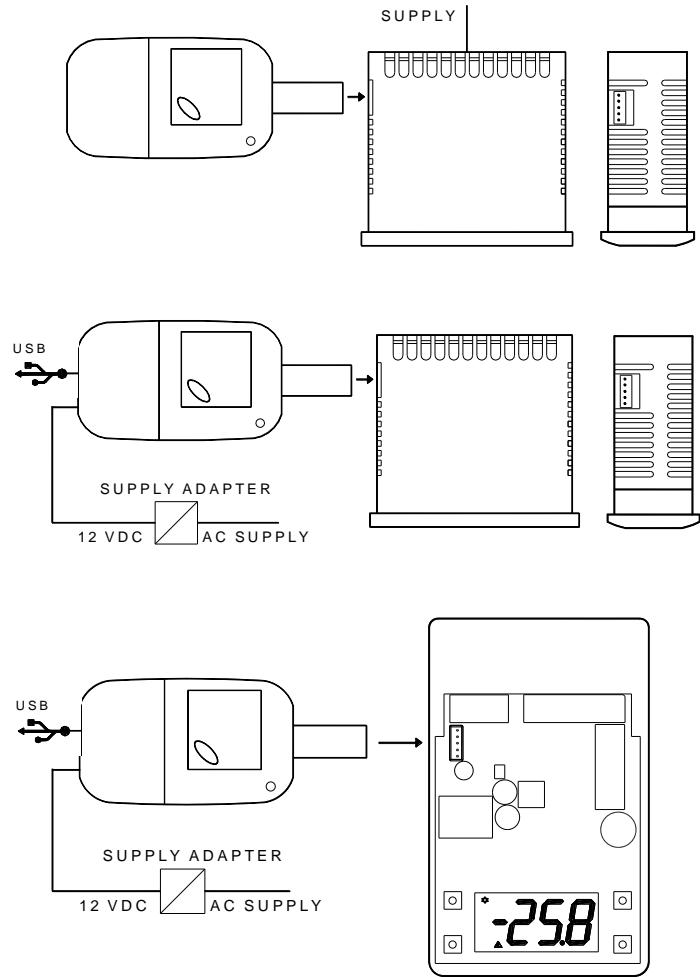
The maximum and minimum alarm temperature can be disabled setting: "A.HA" e "A.LA" = oF.

4.7 – ACCESSORIES

4.7.1 – KEY USB + OSAKA SETUP: KEY PROGRAMMING

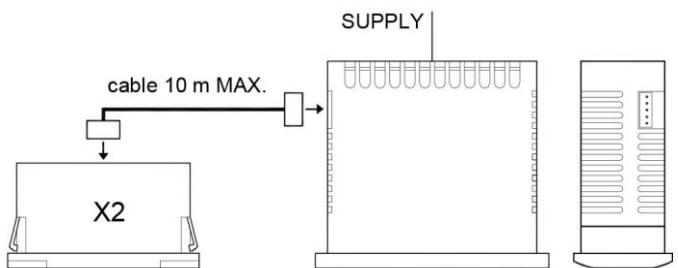
Extracting the box you have access to a white connector that allows easy programming with programming key 5 pin. This key allows repetitive schedules and save the settings in a practical and simple. There are 2 types of Key, the key enabling USB connection pc and save the different configurations and set parameters and Manual Key 5 pin only for connecting thermostats.

An advantage and recommendation is the use of the supplied power supply KEY without connecting the **F 100 / TSF 100 / M1** to power.



4.7.2 – X2 - REMOTE DISPLAY

The equipment you can connect a remote display device X2 by a cable that can be up to **10 meters** at maximum. The X2 device powered directly from the device, displays temperature measured by the probe Pr1 by a 2-digit display and a half.



5 – LIST OF PARAMETERS

Parameter listing. Some of them might be on the menu with password and some without, shortcut or may not be present depending on the model:

Par.	Description	Range	Def.	Note
S. – Parameters Set Point value to regulate				
1 S.LS	Minimum Set Point	-99.9 ÷ HS	-50.0	
2 S.HS	Maximum Set Point	LS ÷ 999	99.0	
3 SP	Set Point	-LS ÷ HS	0.0	
i. – Probe parameters selection and correction				
4 i.SE	Type of probe	Pt / nt	nt	
5 i.uP	Unit of measure and resolution (decimal point) C0 = ° C without p.dec 1° F0 = ° F without p.dec 1° C1 = ° C with 0.1 ° dec F1 = ° F with 0.1 ° dec	C0 / F0 / C1 / F1	C1	
6 i.Ft	Measuring filter	oF ÷ 20.0 sec	2.0	
7 i.C1	probe calibration	-30.0 ÷ 30.0 °C/F	0.0	
r. – Parameters of temperature regulation				
8 r.d	Differential (Hysteresis) regulation	0.0 ÷ 30.0 °C/F	2.0	
9 r.t1	Output relay activation time for probe faulty or broken	oF/ 0.01 ÷ 9.59 (min.sec) ÷ 99.5 (min.sec.x10)	oF	
10 r.t2	Stop time relay output for faulty sensor or broken	oF/ 0.01 ÷ 9.59 (min.sec) ÷ 99.5 (min.sec.x10)	oF	
11 r.HC	Operating mode output: H = Heat (heat) C = Cold (cold)	H - C	C	
d. – Defrost Control Parameters				
12 d.di	Interval between defrost	oF/ 0.01 ÷ 9.59 (h.min.) ÷ 99.5 (hrs.min.x10)	6.00	
13 d.Sd	Delay to start defrosting (oF = defrost at start)	oF/ 0.01 ÷ 9.59 (h.min.) ÷ 99.5 (hrs.min.x10)	02,0	
14 d.dE	Duration defrost	oF/ 0.01 ÷ 9.59 (min.sec) ÷ 99.5 (min.sec.x10)	oF	
15 d.dL	Block display during defrost: oF = not active on = Active with last measure Lb = active with abbreviations ("dEF" defrosting and "PdF" in Post-defrost recovering)	oF - on - Lb	oF	
P. Parameters relating to the protection of the compressor and delay starting.				
16 P.P1	Exit delay activation	oF/ 0.01 ÷ 9.59 (min.sec) ÷ 99.5 (min.sec.x10)	oF	
17 P.P2	Disabling postarrest output (relay)	oF/ 0.01 ÷ 9.59 (min.sec) ÷ 99.5 (min.sec.x10)	oF	

18 P.P3	Minimum time after two starts departure.	oF/ 0.01 ÷ 9.59 (min.sec) ÷ 99.5 (min.sec.x10)	oF	
19 P.od	Output activation delay at start (supply)	oF/ 0.01 ÷ 9.59 (min.sec) ÷ 99.5 (min.sec.x10)	oF	
A. – Alarm parameters				
20 A.Ay	Temperature alarm type: 1 = Absolute 2 = Relative	1 / 2 (/ 3 / 4 / 5 / 6 / 7 / 8 = No use)	1	
21 A.HA	Set alarm for high temperature	oF / -99.9 ÷ 999 °C/F	oF	
22 A.LA	Set alarm for low temperature	oF / -99.9 ÷ 999 °C/F	oF	
23 A.Ad	Differential temperature alarm	0.0 ÷ 30.0 °C/F	1.0	
24 A.At	Temperature alarm delay	oF/ 0.01 ÷ 9.59 (min.sec) ÷ 99.5 (min.sec.x10)	oF	
25 A.PA	Delay of temperature alarm at start (power)	oF/ 0.01 ÷ 9.59 (h.min.) ÷ 99.5 (hrs.min.x10)	2.00	
26 A.dA	Delay of temperature alarm after defrost defrost lock display	oF/ 0.01 ÷ 9.59 (h.min.) ÷ 99.5 (h.min.x10)	1.00	
o. – Buzzer alarm configuration parameters				
27 o.bu	buzzer operation oF = disable 1 = one alarm 2 = only for keyboard use 3 = active alarm and keypad	oF / 1 / 2 / 3	3	
t. – Keyboard Configuration Parameters				
28 t.UF	Operation mode key "F" or . oF = no function 4 = On / stop (Standby)	oF / 4 (1 / 2 / 3 = No use)	4	
29 t.Lo	Automatic keyguard	oF/ 0.01 ÷ 9.59 (min.sec) ÷ 30.0 (min.sec.x10)	oF	
30 t.PP	Password access to operating parameters	oF ÷ 999	oF	

6 – TROUBLESHOOTING, MAINTENANCE AND WARRANTY

6.1 – SIGNALS

Error	Reason	Action
E1 -E1	The relative probe can be broken (E) or in short circuit (-E), or may have a value that is out of range programmed	Check the connection of the probe to the instrument and verify the correct operation of the probe. (it helps to have the ohms values of the probes)
EPr	Possible anomaly in EEPROM	Press the SET key. Power cycle the instrument
Err	Fatal Error device memory	Replace the device or send it to any repair

In probe error condition the output behaves as scheduled parameters "t1" and "t2".

Indication on Display	Reason
od	Delay-start after power equipment
Ln	Keypad Locked
dEF	Defrost active display if "d.dL" = Lb
PdF	Defrost finish recovering cold if "d.dL" = Lb
Hi	High temperature alarm
Lo	Low temperature alarm

6.2 - CLEANING

We recommend cleaning with a damp cloth only without detergent or detergent.

6.3 - WARRANTY AND REPAIR

This device has a guarantee in form of repair or replacement by manufacturing defects in materials of 12 months from the date of purchase.

OSAKA SOLUTIONS automatically void this guarantee and is not liable for any damages deriving from:

- Use, installation, or use and handling undue, others than those described above and, in particular, differs from the safety requirements established by the regulations.
- Use in applications, machines or electrical panels that do not provide adequate protection against liquids, dust, grease and electric shocks to the installation conditions made.
- The inexperienced handling, and / or alteration of the product.
- The installation / use in applications, machines or electrical panels do not comply with the valid norm.

In case of defective product under warranty or out of that period, it should contact the post sales service to perform the necessary steps. Request document repair "RMA" (by mail or fax) and complete it, is necessary send the RMA and the device to SAT OSAKA by method prepaid.

7 - TECHNICAL DATA

7.1 - ELECTRICAL FEATURES

Supply: 12...24 VAC/DC (F 100) - 100...240 VAC +/- 10%

Frequency AC: 50/60 Hz

Consumption: 4 VA

Input i: 1 input for temperature sensor NTC (103AT-2, 10 K Ω @ 25 °C) o PTC (KTY 81-121, 990 Ω @ 25 °C)

Output: 1 Relay SPDT

M1: 8A-AC1 (3A-AC3) / 250 VAC

F 100 / TSF 100: 16A-AC1 (9A-AC3) / 250 VAC

Electrical life relay output: 100000 op.

Power supply: EN 60730-1 type 1.B

Oversupply category: II

Device Class: Class II

Isolation: Isolated by piece low voltage (power 115/230 V and relay outputs); and part low voltage inputs; Electrically isolated between output and supply.

7.2 - MECHANICAL FEATURES

Carcase: Plastic self-extinguishing UL 94 V0

Category of resistance to heat and fire: D

Dimensions: 78 X 35 mm, prof. 64 mm

Weight: 120 g approx.

Installation: on panel, recessed 71x29mm

Connection: Terminal block 2,5 mm²

Sealing degree: IP65

Ambient operating temperature: 0 T 50 °C

Operating humidity: <95% RH non-condensing

Storage and transport temperature: -25 °C T 60

7.3 - FUNCTIONAL FEATURES

Temperature regulation: ON / OFF

Defrost control: interval for compressor failure.

Measuring range: NTC: -50 ... 109 °C / -58 ... 228 °F; PTC: -50 ...

150 °C / -58 ... 302 °F

Display resolution: 1 ° or 0.1 ° (pitch -99.9 .. 99.9 ° C)

Total accuracy: +/- (0.5% FS + 1 digit)

Time measured speed (no filter): 130 ms

Display: 3 Digit 15.5 mm h

Software class structure: Class A

Compliance: Directive 2004/108/EC (EN55022 class B, EN61000-4-2: 8KV air, 4KV cont; EN61000-4-3. 10V / m, EN61000-4-4: 2KV power, inputs, outputs; EN61000-4-5: com 2KV power mode, 1 kV \ diff mode, EN61000-4-6: 3V), 2006/95/EC (EN 60730-1, EN 60730-2-7, EN 60730-2 - 9)

7.4 - MECHANICAL DIMENSIONS AND MOUNTING

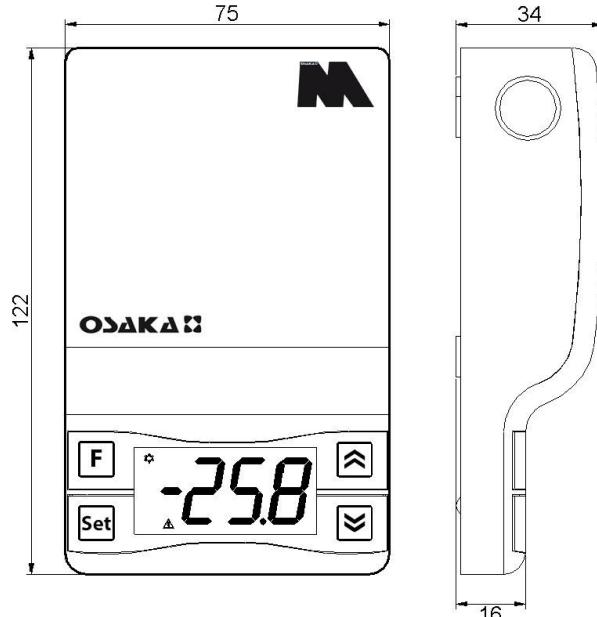
F 100



TSF 100



M 1



HOLES PANEL

- F 100/100 TSF: 29 x 71 mm

FIXING

- F 100/100 TSF: lateral Staples

- M1: Area through screw